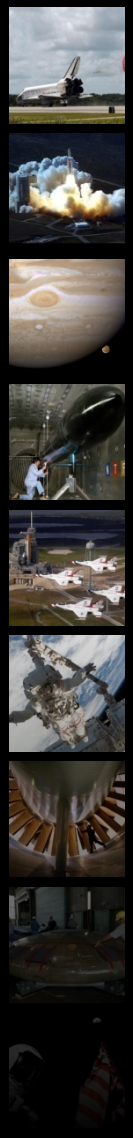
National Aeronautics and Space Administration



# Workplace Safety on ISS

**Senior Leadership ViTS Meeting**
October 5, 2015

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Director, Safety and Mission Assurance
Johnson Space Center

**This and previous presentations are archived at**
https://sma.nasa.gov/safety-messages

# Workplace Safety on ISS

- Similar to training and activities we perform at the Johnson Space Center (JSC), there are many activities on the International Space Station (ISS) that help keep it safe as a workplace.

| JSC Examples | ISS Examples |
|---|---|
| • Job Hazard Analysis Training | • ISS Safety Briefing Upon Arrival |
| • Hazard Communication and Emergency Response | • Emergency Roles and Responsibilities Review |
| • Fire Drills | • Emergency On-Board Training Sessions |
| • Periodic Office Cleanup Activities | • Weekly Housekeeping Activities |
| • Safety Walkthroughs | • ISS Safety Video Survey |
| • Automated External Defibrillator (AED) Inspections | • Emergency Equipment and AED Inspections |

- The activities above help to
  - Inform everyone of workplace hazards and what to do in an emergency
  - Maintain a safe workplace by keeping an orderly environment and having another set of eyes on spaces we see every day
  - Ensure our emergency equipment is always ready to use

# Personal Protective Equipment Use on ISS

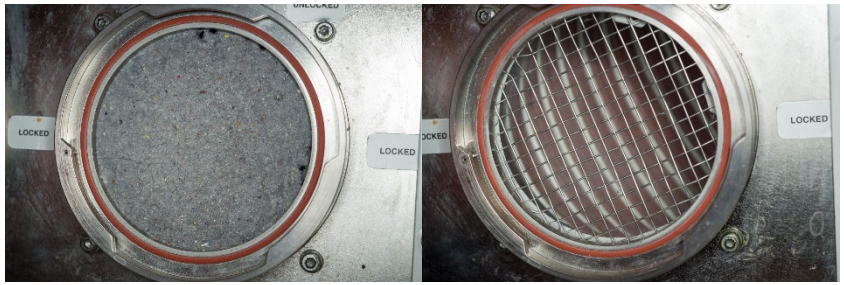
- As we expect in laboratories on the ground, ISS crewmembers use carefully reviewed procedures to perform their daily tasks and often use Personal Protective Equipment (PPE) to protect themselves from associated hazards.
- In addition to being a laboratory environment, ISS crewmembers are required to perform maintenance on their work equipment and living facilities regularly which can introduce additional hazards.
- Potential hazards are highlighted in procedures and PPE is donned when needed in the microgravity environment.

ISS crewmembers Mike Fossum (L) and Dan Burbank (R) prepare to work on the Water Recovery System by donning their PPE.

# Weekly Housekeeping on ISS

- Regular housekeeping on ISS helps maintain a healthy and safe environment:
  - Cleaning frequently touched surfaces and inspecting for accumulation of condensation or visible microbial growth
  - Cleaning power supply grilles and computer vents to prevent overheating
  - Ensuring flammable materials are moved away from potential ignition sources
  - Vacuuming dusty areas and inspecting ventilation diffusers/grilles/air inlets for blockages to ensure good airflow

ISS Crewmember Luca Parmitano performing crew quarters cleaning on ISS

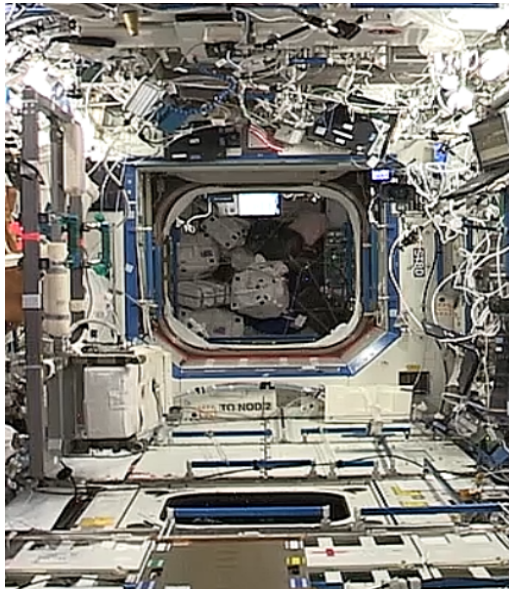



BEFORE AFTER

Cleaning of Cabin O2/N2 Discharge Intermodule Ventilation (IMV) Air Return Filter

# ISS Safety Walkthrough

- Even with regular cleaning and watching for potential hazards, it can still be helpful to have a fresh pair of eyes trained to look for hazards—especially when multiple people are utilizing the same space.
- Every 6 months the crew is asked to methodically film the entire cabin interior of the U.S. Orbital Segment (USOS) as well as their egress paths to each Soyuz vehicle.
- This safety video survey is reviewed by a team of ground-based engineers for key items:
  - Emergency Egress Guidance System (EEGS) marker visibility and condition
  - Emergency and Critical Equipment Accessibility
  - Fire Port Accessibility
  - Flammable Materials Management
  - Clear Hatches and Presence of Drag-throughs
  - Clear Ventilation Paths
  - Clear Translation Paths
- After team members on the ground review the detailed video, the crew is notified of any concerns.
- The video saves considerable crew time by having ground-based team members assist in performing inspections.

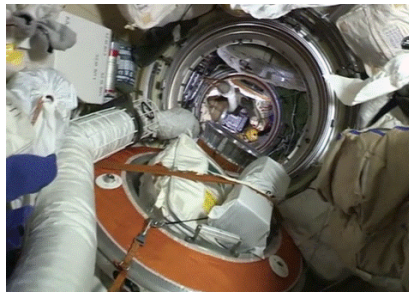


View of U.S. Lab during July 2015 video survey

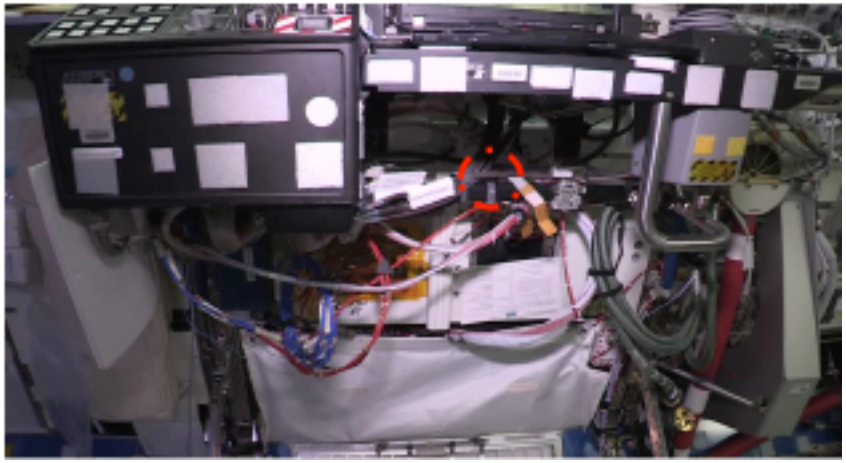
# ISS Safety Video Survey Benefits

## Example ISS Safety Video Survey Findings

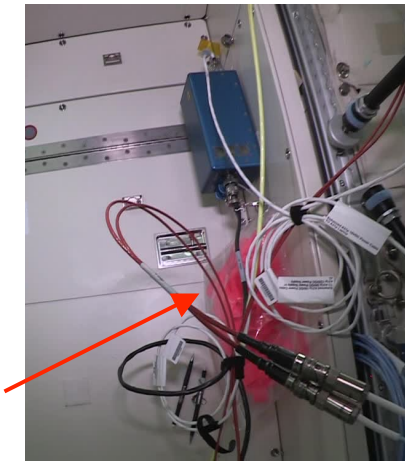
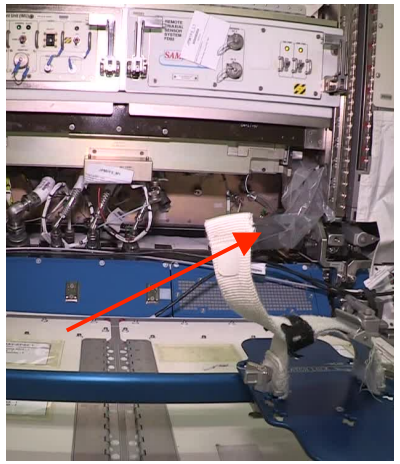

BEFORE (L): A/L IMV Inlet did not have sufficient clearance for proper ventilation and emergency masks were not in correct location
AFTER (R): Stowage moved away from IMV Inlet for ventilation and emergency masks correctly located and stowed (January 2014)




Before (L) and after (R) of stowage potentially impeding Russian hatch closure (July 2015)



Fire port blocked by Robotics Workstation in Lab (December 2014)

Flammable materials near potential ignition sources in Japanese Pressurized Module (December 2014)

# Summary

- On ISS, crewmembers receive the same types of training and protective equipment that we would, but some potential hazards may be treated differently due to the microgravity environment.
- In a sealed environment, and for one as dynamic as ISS, regular cleaning and routine inspections become even more important than they are for us on the ground.
- Surveying a workplace with a fresh pair of eyes trained to look for hazards can help all of us create a safer environment.